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CLAIMS:

1. A digital volume control device to which a digital input signal to be controlled is supplied which provides for a volume controlled digital output signal, the volume control of said digital input signal being determined by a control input signal, characterized in that the digital volume control device further comprises:
 - 5 - conversion means for receiving the control signal in the form of a succession of m-bits words having k active bits at a first sample frequency and converting the control signal into an intermediate comprising a succession of m-bits words having j active bits at a second sample frequency at least k/j greater than the first sample frequency;
 - averaging means for generating an multiplied signal by multiplying the
 - 10 intermediate signal with the digital input signal and generating the output signal by averaging the multiplied signal.
2. A digital volume control device as claimed in claim 1, characterized in that the conversion means comprises an up-sampler for up-sampling of the control signal and a bit-stream converter for converting the up-sampled control signal into the intermediate signal.
- 15 3. A digital volume control device as claimed in claim 2, characterized in that the bit-stream converter is a noise-shaper having a combiner for generating an m-bit combination signal by combining the control signal with an m-bit error signal, a quantizer for generating the intermediate signal by passing-on only the j most significant bits of the combination signal setting the remaining bits to zero, and a feed back loop for generating the error signal out of the quantizer errors.
- 20 4. A digital volume control device as claimed in any of the claims 1 to 3, characterized in that $j = 1$, whereas the averaging means comprises a shift register for multiplying the intermediate signal with the digital input signal.
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5. A digital volume control device as claimed in any of the claims 1 to 4, characterized in that the conversion means comprises a low-pass filter is provided for filtering the control signal before up-sampling.

5 6. A digital volume control device as claimed in claim 5, characterized in that the low-pass filter is an infinite impulse response filter.

7. A digital volume control device as claimed in any of the claims 1 to 6, characterized in that the averaging means comprise a low-pass output filter.

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8. A digital volume control device as claimed in claim 7, characterized in that the low-pass output filter is a infinite impulse response filter.

9. A digital volume control device as claimed in claim 7, characterized in that an 15 up-sampler is provided for up-sampling the digital input signal with a factor k/j , and the low-pass output filter is formed by a finite impulse response filter having k/j taps.

10. A digital volume control device as claimed in any of the claims 1 to 9, characterized in that a dB-to-linear decoder is provided for generating the control signal in 20 dependence upon an n-bit logarithmic control signal.

11. A digital volume control device as claimed in claim 10, characterized in that the output signal of the volume device covers a range of about 94 dB, whereas $n = 6$, $m = 20$, and $k = 4$.

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12. An audio apparatus comprising a digital volume control device according to any of the preceding claims.